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The above magnitudes are based on Professor Barnard's observations of faint comparison stars near the Nova. (See *M. N.* 62, 65.)

<i>Nova Geminorum</i> No. 1		
1917 Feb.	9	14.6
"	12	14.6
Nov.	13	14.6
1918 Jan.	4	14.9

These magnitudes are based on Professor Parkhurst's photometric measures of faint stars near the Nova. (See *Astrophysical Journal*, XVII, p. 373.)

<i>Nova Geminorum</i> No. 2		
1917 Feb.	10	10.4
Nov.	12	10.0
"	21	9.6
Dec.	5	10.0
1918 Jan.	3	10.4

These observations are based on the scale of magnitudes published by Kaiser in *A. N.* 4586.

Lowell Observatory, C. O. LAMPLAND.
Flagstaff, Arizona,
January 15, 1918.

DARK NEBULAE

In some of the great diffuse nebulosities the photographs show clear-cut black spots projected on the bright background of the nebula. These spots are generally rather irregular in shape, and are sometimes referred to as "holes" in the nebulosity. Some of the best examples of these appearances are found in the great nebula Messier 8, in *Sagittarius* (see Figure 1, facing p. 94, *Publ. Astr. Soc. of the Pac.*, 29, April, 1917). Reference to this illustration will show at least five prominent markings of this class, besides a number of smaller ones. I have never been able to believe that these are really "holes" in the nebula. In the first place, the edges are often so clear-cut and sharp that it seems much more reasonable to suppose that these are masses of dark matter, "dark nebulae," between us and the luminous background of the greater, bright nebulosity. Again, all lines of evidence point to the conclusion that such an object as Messier 8 is many trillions of miles, perhaps many light-years, in thickness. "Tunnels" trillions of miles in length thru the enormous extent of this nebula, and happening to point precisely to our own position in space, seem against all probability.

There are quite a number of the diffuse nebulosities which seem to be surrounded by dark nebulous matter. One of the best examples is N. G. C. II 5146, shown as Figure 2 in the number of the PUBLICATIONS referred to above. The cutting off of the fainter stars in the region immediately surrounding such nebulosities is often very striking.

I have recently photographed with the Crossley reflector a number of the "dark nebulae," two of which are such wonderful and striking objects that I have reproduced them in Figures 1 and 2, Plate IV; so far as I know, no photographs of these objects have hitherto been published on so large a scale.

Figure 1 shows the region just south of ζ *Orionis* ($\alpha = 5^h 36^m.0$; $\delta = -2^\circ 27'$). This region is one of the most wonderful in the sky, but unfortunately it is impossible to cover all the features in a single Crossley plate. To the north is the enormous diffuse nebula N. G. C. 2024, at the east of ζ *Orionis* (beyond the edge of the illustration), with a remarkable dark lane dividing it into two irregular masses (shown in *Lick Observatory Publications*, Vol. VIII, Plate 13). Extending for fully a degree from ζ *Orionis* in a direction slightly east of south, is a long, narrow, rather faint line of nebula. Near the bright star this ray takes a slight bend toward the east, and the halation effect from the bright star makes it impossible to say whether the nebulous ray actually reaches ζ *Orionis* or not. To the west (right) of the long ray there is very faint nebula, and numerous faint stars; to the east (left) of the ray practically none. East of the long ray is seen the diffuse nebula N. G. C. 2023, surrounding a ninth magnitude star; this nebula shows a number of sinuous dark lanes which suggest dark nebulous matter. Still farther east, but not shown in the illustration, is a similar, somewhat smaller mass of diffuse nebula (N. G. C. I 435). But the most striking feature of the region is a remarkable dark bay jutting into and bifurcating the long ray. This "bay" is about 5' wide and 4' deep; like an ink-blot, except for a faint wisp visible within it at the north, and is almost as sharp as a knife-scratch at its western and southern edges.

The dark nebula shown in Figure 2 is, in some respects, even more striking because it is seen upon a background furnished by a very dense region of the Milky Way. This object was discovered by Professor Barnard in 1883, with a five-inch telescope, while comet-seeking. It is located at $\alpha = 17^h 56^m.6$; $\delta = -27^\circ 50'$.



FIG. 1—Dark Nebula near N. G. C. I 434; $5^{\text{h}} 36^{\text{m}}.0$; $-2^{\circ} 27'$.



FIG. 2—Dark Nebula at $17^{\text{h}} 56^{\text{m}}.6$; $-27^{\circ} 50'$.

PLATE IV

Its contour is rather irregular, and it is about 6' x 4' in size. Its most striking feature is the roughly circular protuberance seen at the lower right hand (southwest) corner. Here the edges are defined with almost perfect sharpness, and there is an astonishingly abrupt transition from the background of faint stars so closely packed that they seem almost a continuous sheet, to a region absolutely blank. At this point it really seems as tho one could "see" the sharp edge of the dark nebula. On its eastern edge the transition is somewhat less abrupt. The coarse cluster of bright stars to the east (left) of this striking object serves to accentuate the beauty of the region.

It is impossible to look at the original negatives of these interesting objects and not be convinced that there is something dark between us and the general background of stars; I firmly believe that these are actual "dark nebulae." Perhaps spectroscopic studies of stars involved in diffuse nebulae which show such occulting effects in their peripheral regions may some day enlighten us as to the actual nature of whatever it may be which composes the dark nebulae. That they are "holes" torn in the star fabric of the Milky Way by some rapidly rushing star-cluster is difficult to believe, when one studies carefully the sharply defined edges. If merely "holes," we must assume their age as of the order of hundreds of millions of years, in which time, as Dr. Campbell has pointed out, the random motions of the stars in the neighborhood would long since have obliterated the clear-cut edges, if not the "hole" itself.

January, 1918.

HEBER D. CURTIS.

WIRELESS TIME SERVICE IN THE PHILIPPINE ISLANDS

The progress in the time service of the Philippine Islands is made evident from the fact that since October 1, 1917, the Cavite Radio Station co-operating with the Bureau of Posts and the Manila Observatory sends out time signals of the 120th meridian East of Greenwich at 11 A. M. and 10 P. M. every day, Sundays and holidays inclusive. The establishment of a wireless time service in the Philippine Islands had been strongly urged by the undersigned in many conversations with members of the observatory staff and officers of the American Navy. Manila holds an enviable position in the Pacific and the interests of shipping companies making Manila a port of call are too prosperous to be overlooked. Accurate